THE DETERMINANTS OF HEALTH CARE EXPENDITURE:

AN EMPIRICAL EVIDENCE FROM ASEAN COUNTRIES

By:

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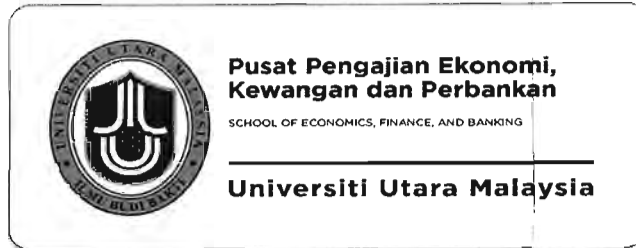
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ABSTRACT

The main motivation of this research project is to investigate the determinants of Health Care Expenditure (HCE): an empirical evidence from ASEAN countries. There are 200 total observations that involved annual data from 1995 to 2014 in Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Data collection for this study is based on secondary data that obtained from the Central of International Data, World Development Indicator (World Bank Database, 2016), World Health Organization (WHO, 2016), ASEAN Up Database and also from the central bank of each country. The data used in this study is to prove the significant relationship between dependent and independent variables for the four models. The first model, Panel A analyses the relationship between HCE with the Gross Domestic Product (GDP), Population, Life Insurance Coverage (LIC), Household Final Consumption Expenditure (HFCE) and Consumer Price Index (CPI). For the second model, Panel B examines the significant influence of HCE, Population, LIC, HFCE and CPI on the economic growth. Based on the variables of these both models, then Panel C and Panel D were generated by using natural logarithm (ln). Pooled Ordinary Least Square (POLS) of Regression Model revealed that Panel A found the GDP, Population, LIC and CPI are positively correlated to the HCE that have the statistical significant at 0.01 level. However, there is a negative relationship between HFCE and HCE at the statistical significant of 0.01 level. Next, Panel B indicated the HCE, LIC and HFCE have positive correlation with GDP at the statistical significant of 0.01 level except for LIC at 0.05 level. While, there is a negative relationship between Population and CPI with the GDP at statistical significant of 0.01 and 0.10 level respectively. Panel C represented the lnGDP, lnLIC, lnHFCE and lnCPI are positively correlated to the lnHCE that have the statistical significant at 0.01 level. However, there is a negative relationship between lnPop and lnHCE at the statistical significant of 0.01. Last but not least, Panel D showed the lnHCE, lnPop and lnLIC have positive correlation with lnGDP at the statistical significant of 0.01 level except for lnLIC that has no statistical influence. While, there is a negative relationship between lnHFCE and lnCPI with lnGDP at the statistical significant of 0.01 level. Regarding to these findings, this study was supported the previous

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empirical works as well as presents the several policy implications and recommendations for research improvement in the future.

ABSTRAK

Motivasi utama projek penyelidikan ini adalah untuk menyiasat penentu Perbelanjaan Penjagaan Kesihatan (HCE): bukti empirikal dari negara-negara ASEAN. Terdapat 200 jumlah pemerhatian yang melibatkan data tahunan dari 1995 sehingga 2014 di Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Pengumpulan data untuk kajian ini adalah berdasarkan data sekunder yang diperoleh daripada Central of International Data, World Development Indicator (World Bank Database, 2016), World Health Organization (WHO, 2016), ASEAN Up Database dan juga daripada bank pusat setiap negara. Data yang digunakan dalam kajian ini adalah untuk membuktikan hubungan yang signifikan antara pembolehubah bersandar dan pembolehubah bergerakbalas bagi keempat-empat model. Model pertama, Panel A menganalisis hubungan antara HCE dengan Keluaran Dalam Negara Kasar (GDP), Populasi, Perlindungan Insurans Hayat (LIC), Perbelanjaan Akhir Penggunaan Isi Rumah (HFCE) dan Indeks Harga Pengguna (CPI). Bagi model kedua, Panel B mengkaji pengaruh penting HCE, Populasi, LIC, HFCE dan CPI terhadap pertumbuhan ekonomi. Berdasarkan pembolehubah bagi kedua-dua model ini, maka Panel C dan Panel D dibentuk dengan menggunakan natural logarithm (ln). Model Regrasi iaitu Pooled Ordinary Least Square (POLS) mendedahkan bahawa Panel A mendapati GDP, Populasi, LIC dan CPI berhubung positif dengan HCE yang mempunyai signifikan statistik pada tahap 0.01. Manakala, terdapat hubungan negatif antara HFCE dan HCE pada tahap signifikan statistik 0.01. Seterusnya, Panel B menyatakan HCE, LIC dan HFCE mempunyai hubungan positif dengan GDP pada tahap signifikan statistik 0.01 kecuali bagi LIC pada tahap 0.05. Sementara itu, terdapat hubungan yang negatif antara Populasi dan CPI dengan GDP pada tahap signifikan statistik 0.01 dan 0.10 masing-masing. Panel C menunjukkan lnGDP, lnLIC, lnHFCE dan lnCPI berhubung positif kepada lnHCE yang mempunyai signifikan statistik pada tahap 0.01. Manakala, terdapat hubungan negatif antara lnPop dan lnHCE pada tahap signifikan statistik 0.01. Akhir sekali, Panel D memperlihatkan lnHCE, lnPop dan lnLIC mempunyai hubungan positif dengan lnGDP pada tahap signifikan statistik 0.01 kecuali bagi lnLIC yang tidak mempunyai pengaruh statistic. Sementara itu, terdapat hubungan negative antara lnHFCE dan

lnCPI dengan lnGDP pada tahap signifikan statistic 0.01. Berhubung penemuan berkenaan, didapati kajian ini menyokong hasil empirical terdahulu di samping mengemukakan beberapa implikasi dasar beserta cadangan bagi penambahbaikan penyelidikan pada masa hadapan.

Kata kunci:

Negara-negara ASEAN, Perbelanjaan Penjagaan Kesihatan (HCE), Keluaran Dalam Negara Kasar (GDP), Populasi, Perlindungan Insurans Hayat (LIC), Perbelanjaan Akhir Penggunaan Isi Rumah (HFCE), Indeks Harga Pengguna (CPI) dan Model Regrasi iaitu Pooled Ordinary Least Square (POLS).

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

ADF	: Augmented Dickey-Fuller;
ANOVA	: Analysis of Variance;
ASEAN	: Association of Southeast Asian Nations;
BNM	: Bank Negara Malaysia;
CE	: Common Effects;
CPI	: Consumer Price Index;
FE	: Fixed Effects;
GDP	: Gross Domestic Product;
GMM	: Generalized Method of Moments;
HCE	: Health Care Expenditure;
HFCE	: Household Final Consumption Expenditure;
LIC	: Life Insurance Coverage;
MAS	: Monetary Authority of Singapore;
OECD	: Organisation for Economic Co-operation and Development;
POLS	: Pooled Ordinary Least Square;
Pop	: Population;
PP	: Phillips-Peron;
RE	: Random Effects;
UK	: United Kingdom;
U.S.	: United States;
WHO	: World Health Organization;

β_0	:	An Intercept;
$\beta_0 + v_i$	:	Constant of Each Section;
β_{0i}	:	Heterogeneity or Unobserved Effect;
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$	:	Coefficient of the Parameters;
H_1	:	Null Hypothesis;
H_2	:	Alternate Hypothesis;
i	:	Cross-sectional Unit;
ln	:	Natural Logarithm;
Sig.	:	Significance;
t	:	Time Period;
vif	:	Variance Inflation Factor;
v_i	:	Zero Mean Standard Random Variable;
μit	:	Error Term (Disturbance Term);
$\bar{x}$	:	Mean of Sample;
σ	:	Standard Deviation.
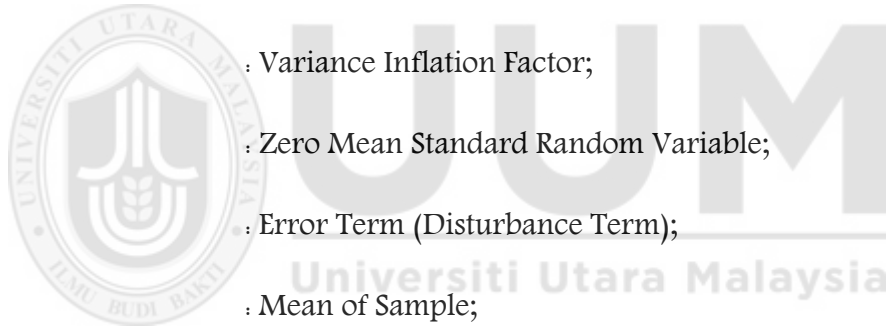
CHAPTER ONE

INTRODUCTION

1.0   Introduction

According to Medical Dictionary, health care could be illustrated as the maintaining and restoration of health by the treatment and prevention of disease especially by trained and licensed professionals such as in medicine, dentistry, clinical psychology and public health (Thomas Fishbein, 2008). The World Health Organization explained health as the perfect conditions either in mental, physical and well-being as well as not merely to infirmity or the absence of disease (Porta, 2014). Last but not least, health care is the prevention or treatment of illness by doctors, dentists or psychologists. In addition, it also can be defined as an effort in order to maintain or restore the physical health by the treatment of professional and licensed bodies (Merriam Webster, 2015).

The main motivation of this research project is to investigate the determinants of Health Care Expenditures (HCE): an empirical evidence from ASEAN countries. There are twenty years of annual data from 1995 to 2014 that involved ten countries such as Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. By reviewing an existing literature, this study attempts to provide evidence about the main indicators that influenced the expenditures on the health care. Most of the existing literatures have focused on the relationship between health care and economic growth. Therefore, this study contributes to the literature by broadening the body of research on this scarcely investigated area.

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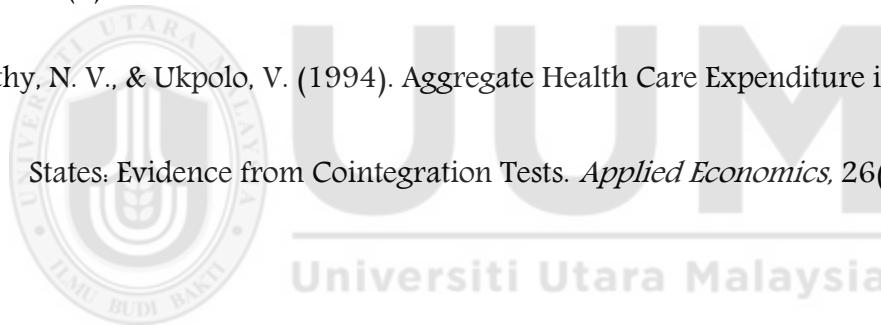
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APPENDIX 1: RESIDUAL NORMALITY TEST [MODEL 1 @ PANEL A]
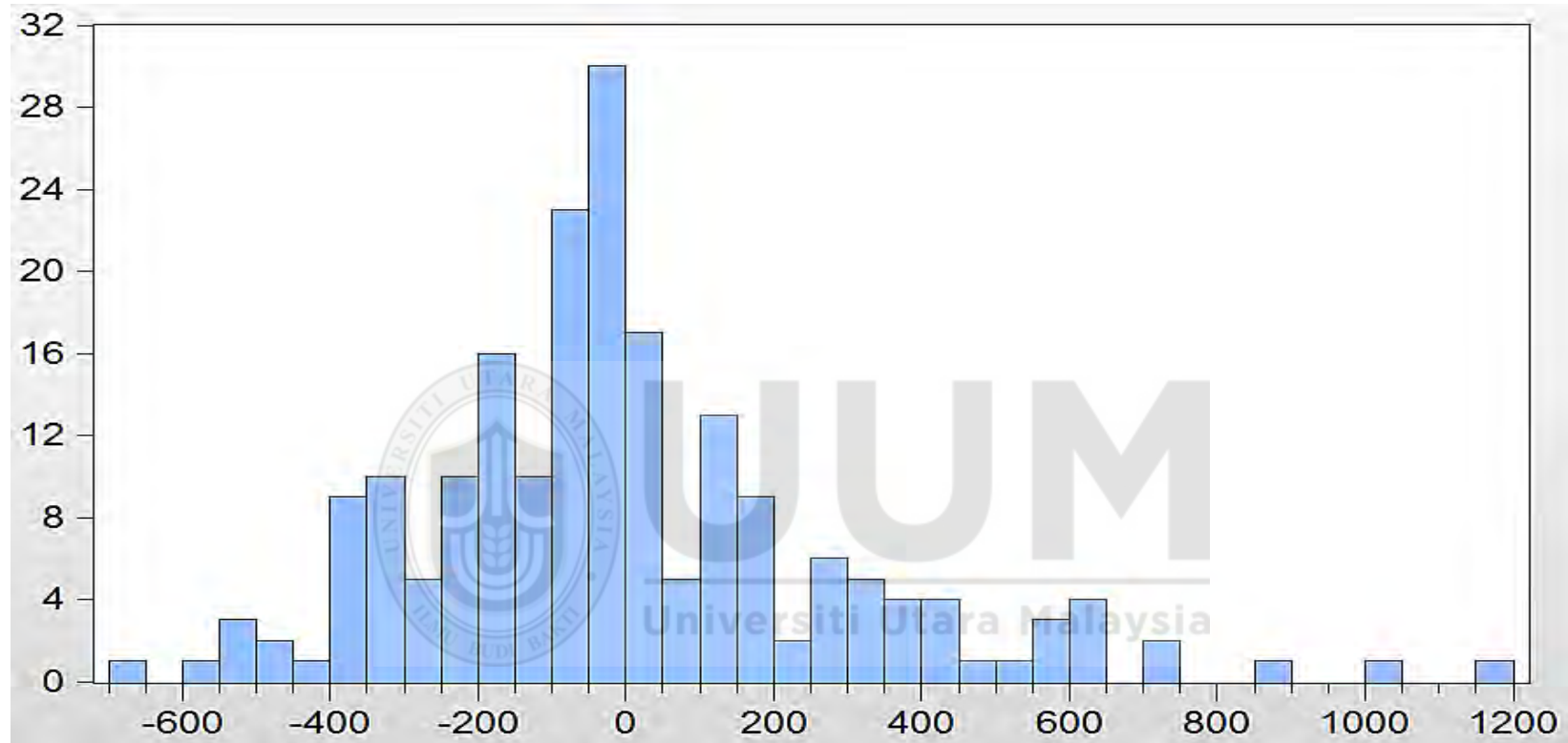
Series	: Standardized Residuals	Mean	: 9.44E-14	Std. Dev.	: 288.2988	Jarque-Bera	: 62.28331
		Median	: -34.96017	Skewness	: 0.965508	Probability	: 0.000000
Sample	: 1995 2014	Maximum	: 1181.818	Kurtosis	: 4.935246		
Observations	: 200	Minimum	: -697.9235				

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APPENDIX 1: RESIDUAL NORMALITY TEST [MODEL 2 @ PANEL B]
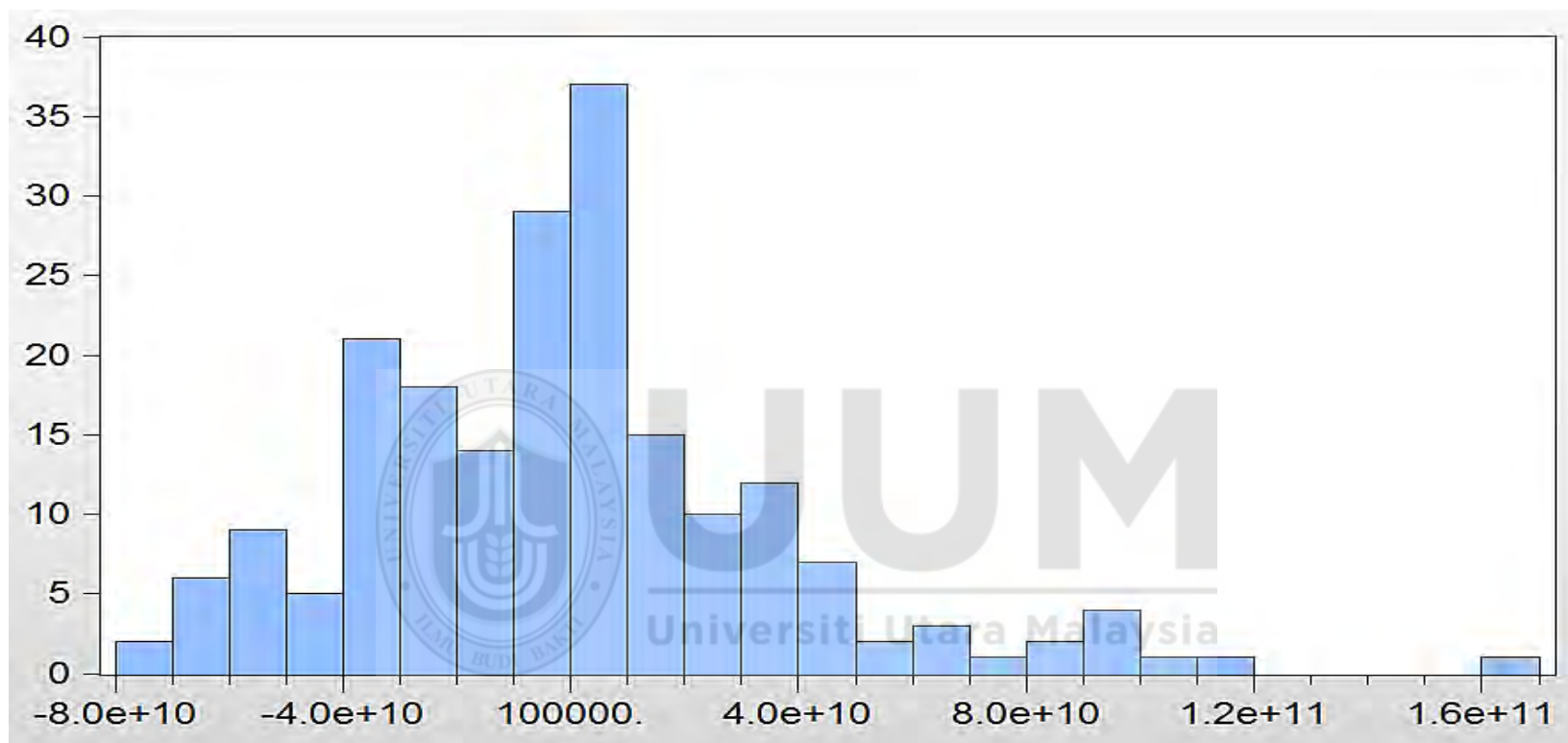
Series	: Standardized	Mean	: 3.55E-05				
	Residuals	Median	: -1.93E+08	Std. Dev.	: 3.75E+10	Jarque-Bera	: 56.23565
				Skewness	: 0.867521	Probability	: 0.000000
Sample	: 1995 2014	Maximum	: 1.66E+11				
				Kurtosis	: 4.933367		
Observations	: 200	Minimum	: -7.98E+10				

APPENDIX 1: RESIDUAL NORMALITY TEST [MODEL 3 @ PANEL C]
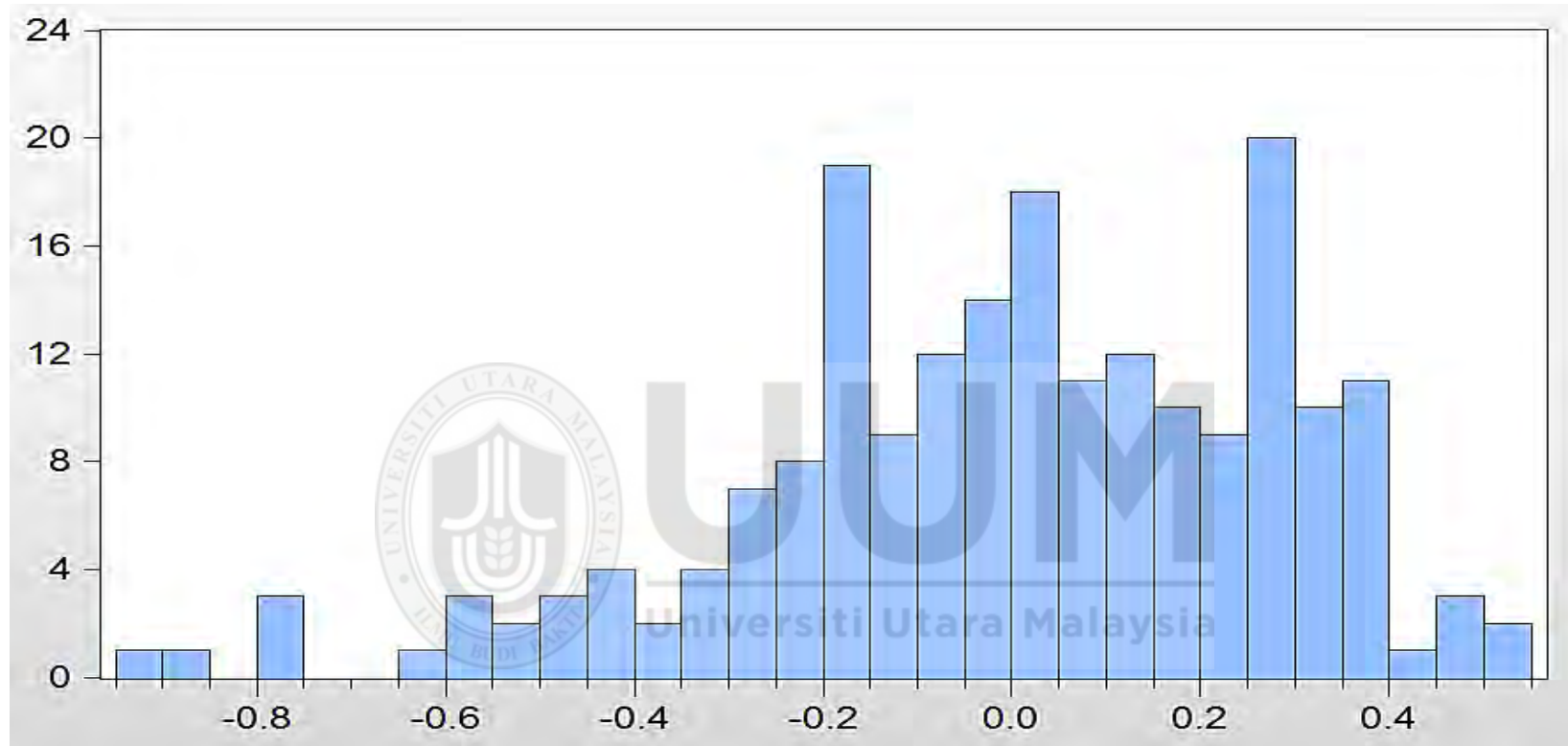
Series	: Standardized	Mean	: 3.23E-15			
	Residuals	Median	: 0.024800	Std. Dev.	: 0.281133	Jarque-Bera : 19.50534
				Skewness	: -0.708266	Probability : 0.000058
Sample	: 1995 2014	Maximum	: 0.540833	Kurtosis	: 3.577994	
Observations	: 200	Minimum	: -0.940066			

APPENDIX 1: RESIDUAL NORMALITY TEST [MODEL 4 @ PANEL D]
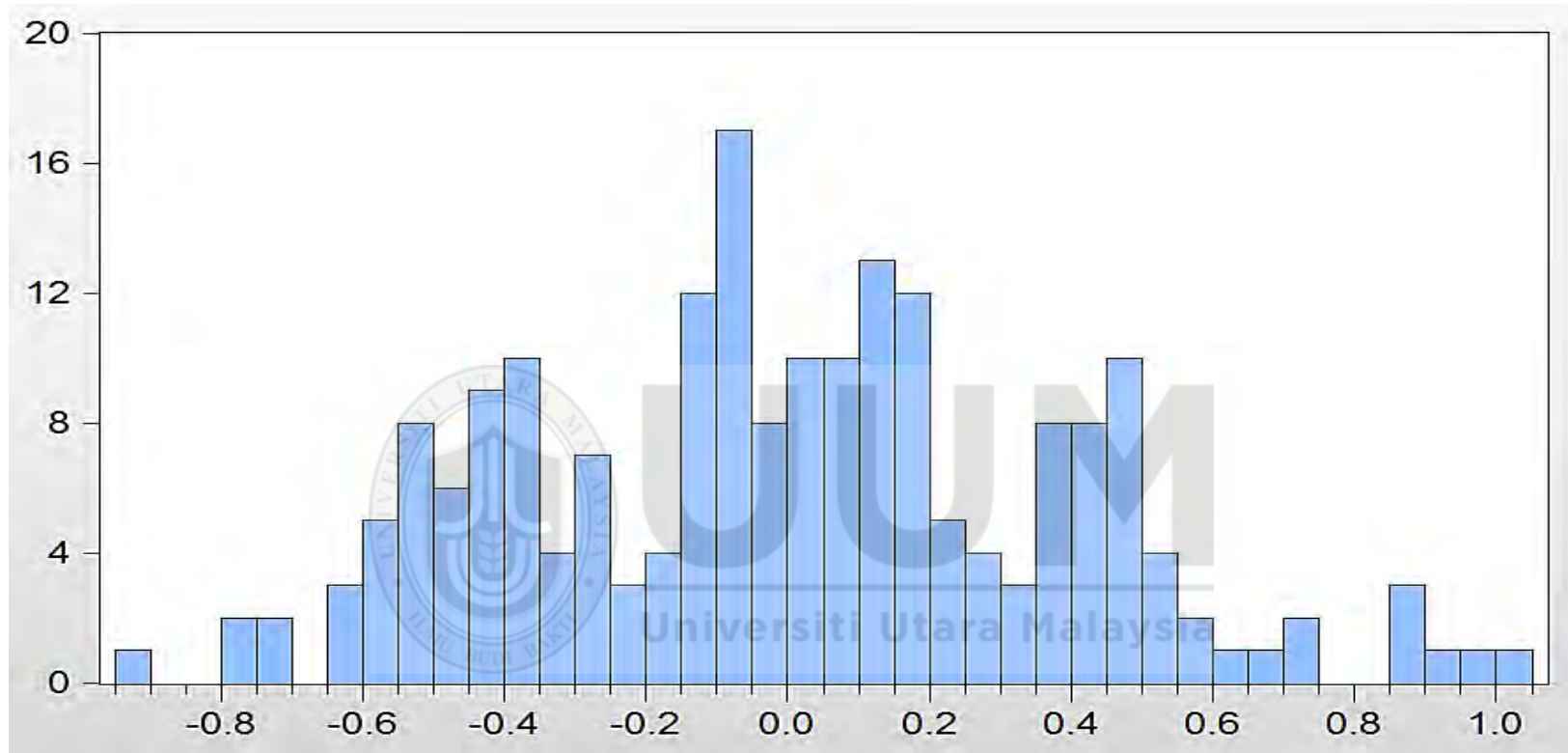
Series	: Standardized	Mean	: 5.92E-15				
	Residuals	Median	: −0.008794	Std. Dev.	: 0.382560	Jarque-Bera	: 1.854025
				Skewness	: 0.185691	Probability	: 0.395734
Sample	: 1995 2014	Maximum	: 1.036288				
				Kurtosis	: 2.709211		
Observations	: 200	Minimum	: −0.939035				

APPENDIX 2: GENERALIZED METHOD OF MOMENTS [MODEL 1 @ PANEL A]

Variable	One Step		Variable	Two Step	
	GMM Difference	GMM System		GMM Difference	GMM System
Panel A					
HCE L1.	1.093651 (0.000)***	1.096353 (0.000)***	HCE L1.	1.078103 (0.000)	1.094706 (0.000)***
GDP	1.87E–10 (0.111)	2.21E–10 (0.037)**	GDP	1.46E–10 (0.130)	1.61E–10 (0.214)
Pop	7.95E–07 (0.647)	1.34E–06 (0.000)***	Pop	–1.78E–06 (0.175)	9.67E–07 (0.097)*
LIC	3.191196 (0.521)	0.0021082 (0.908)	LIC	1.658712 (0.361)	6.114555 (0.011)***
HFCE	–2.19E–10 (0.151)	–2.53E–10 (0.019)***	HFCE	–1.45E–10 (0.091)	–1.67E–10 (0.165)***
CPI	0.1398696 (0.544)	0.0681994 (0.746)	CPI	0.9019969 (0.041)	–0.1081328 (0.344)
_cons	–50.75865 (0.521)***	–80.50212 (0.001)***	cons	30.99947 (0.440)	–51.1141 (0.000)***

Note: HCE: Health Care Expenditure; GDP: Gross Domestic Product; Pop: Population; LIC: Life Insurance Coverage; HFCE: Household Final Consumption Expenditure and CPI: Consumer Price Index.

APPENDIX 2: GENERALIZED METHOD OF MOMENTS [MODEL 2 @ PANEL B]

Variable	One Step		Variable	Two Step	
	GMM Difference	GMM System		GMM Difference	GMM System
Panel B					
GDP L1.	0.5708762 (0.000)***	–1.77E–09 (0.008)***	GDP L1.	–1.11E–09 (0.095)***	0.6143729 (0.000)***
HCE	3.80E+07 (0.000)	5.644644 (0.000)***	HCE	–0.589323 (0.002)	–1.09E+08 (0.000)***
Pop	–1003.485 (0.217)	2.31E–06 (0.000)***	Pop	–0.0000208 (0.000)	–721.1619 (0.000)***
LIC	–1.17EE+08 (0.965)	–863.9484 (0.000)***	LIC	107.5766 (0.002)	6.114555 (0.011)***
HFCE	6.64E–09 (0.000)	2.18E–09 (0.000)***	HFCE	6.64E–09 (0.000)	–1.67E–10 (0.165)***
CPI	2.236087 (0.107)	–12.8861 (0.000)***	CPI	2.236087 (0.107)	–0.1081328 (0.344)
_cons	0 (omitted)	1814.072 (0.000)***	cons	0 (omitted)	–51.1141 (0.000)***

Note: The *, ** and *** are 10%, 5% and 1% level of significant.

APPENDIX 2: GENERALIZED METHOD OF MOMENTS [MODEL 3 @ PANEL C]

Variable	One Step		Variable	Two Step	
	GMM Difference	GMM System		GMM Difference	GMM System
Panel C					
lnHCE L1.	0.6059715 (0.000)***	0.6547864 (0.000)***	lnHCE L1.	0.0316289 (0.907)	0.0412629 (0.887)
lnGDP	3307888 (0.000)***	0.2998672 (0.000)***	lnGDP	0.4562355 (0.112)	0.4227007 (0.166)
lnPop	0.0595437 (0.772)	–0.3658087 (0.000)***	lnPop	–4.193433 (0.322)	–4.498311 (0.294)
lnLIC	0.0021082 (0.908)	0.0234853 (0.111)	lnLIC	–0.0596058 (0.279)	–0.0584618 (0.400)***
lnHFCE	0.0197291 (0.768)	0.0929847 (0.001)***	lnHFCE	1.882122 (0.021)	1.919299 (0.018)***
lnCPI	0.0590095 (0.157)	0.0554339 (0.090)*	lnCPI	–0.3200125 (0.645)	–0.2255723 (0.765)
_cons	–8.116945 (0.006)***	–2.214283 (0.000)***	cons	18.5917 (0.740)	23.32608 (0.682)***

Note: lnHCE: Natural Log of Health Care Expenditures, lnGDP: Natural Log of Gross Domestic Product, lnPop: Natural Log of Population, lnLIC: Natural Log of Life Insurance Coverage, lnHFCE: Natural Log of Household Final Consumption Expenditure and lnCPI: Natural Log of Consumer Price Index.

APPENDIX 2: GENERALIZED METHOD OF MOMENTS [MODEL 4 @ PANEL D]

Variable	One Step		Variable	Two Step	
	GMM Difference	GMM System		GMM Difference	GMM System
Panel D					
lnGDP L1.	0.5043596 (0.000)***	0.6500758 (0.000)***	lnGDP L1.	0.2923397 (0.311)	0.1811359 (0.376)
lnHCE	0.2565488 (0.000)***	0.280535 (0.000)***	lnHCE	0.4050988 (0.162)	0.3058407 (0.086)*
lnPop	0.4649498 (0.006)**	0.3237044 (0.000)***	lnPop	–3.163498 (0.387)	–4.038632 (0.065)**
lnLIC	–0.0136286 (0.359)	0.0068228 (0.649)	lnLIC	0.069847 (0.613)	0.158752 (0.047)**
lnHFCE	0.2848588 (0.000)***	0.023448 (0.284)	lnHFCE	0.9252942 (0.013)	1.621458 (0.036)**
lnCPI	–0.0007772 (0.980)	0.0887008 (0.001)***	lnCPI	0.3347679 (0.436)	0.2061663 (0.459)
_cons	–3.735359 (0.140)	1.005388 (0.015)***	cons	44.52119 (0.364)	45.80779 (0.113)

Note: The *, ** and *** are 10%, 5% and 1% level of significant.